INSTITUTE OF PUBLIC HEALTH

COLLEGE OF MEDICINE AND HEALTH SCIENCES

UNIVERSITY OF GONDAR

PREVALENCE & ASSOCIATED FACTORS OF NIGHT BLINDNESS AMONG PREGNANT & LACTATING WOMEN IN NEADER ADET WOREDA, NORTH ETHIOPIA

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Acronyms

SPSS	Statistical Package for Social Sciences
VAD	Vitamin A Deficiency
VADD	Vitamin A deficiency disorder
WHO	World Health Organization
XN	Night blindness

ABSTRACT

Introduction: Night blindness has been recognized as a public health problem in women of reproductive age. Globally, night blindness affects 9.8 million women which correspond to 7.8% of the population at risk of vitamin A deficiency. Even though the magnitude of previous night blindness among Ethiopian women was reported high (22.1%), factors related to night blindness are not well established particularly in the study area.

Objective: The aim of the study was to assess prevalence of current night blindness & associated factors among pregnant & lactating women of Neader Adet area, North Ethiopia

Methods: Community based cross sectional quantitative study was conducted from March 26 to April 22, 2012 among pregnant & lactating women of Neader Adet woreda, Tigray region. The study included 480, pregnant(287) & lactating(193) women. Multistage sampling stratified by women status (pregnant or lactating) was used to select study subjects. A structured and pretested questionnaire was used for data collection. The data were entered, cleaned and analyzed using SPSS version 16 statistical package. Frequencies & summary statistics were used to describe the study population. Logistic regression analysis was carried out to identify associated factors of night blindness. P- value of ≤0.05 was considered statistically significant.

Result: The prevalence of current night blindness was 18.6% among pregnant & lactating women. In multivariate model, women whose husband attended elementary school & above[AOR=0.333; 95%CI:(0.170,0.654)], no history of night blindness in last pregnancy [AOR= 0.179 ; 95% CI: (0.094,0.339)], lack of land ownership[AOR=3.952; 95% CI: (2.103,7.424)], fetch water greater than 30 minute[AOR=3.93;95%CI: (1.625,9.510)] & had not or one & 3 or more live births were predictors of night blindness among pregnant & lactating women. Lactating women were at a lower risk of night blindness[AOR=0.487; 95% CI: (0.252,0.940)] compared to pregnant women.

Conclusion & Recommendations: the prevalent night blindness underlines that vitamin A deficiency is a major problem among pregnant & lactating women in this population. Pregnant & lactating women with history of night blindness in last pregnancy, lack of land ownership, illiterate husband, fetch water greater than 30 minute & no or one & 3 or more children born alive were at higher risk of night blindness. Increasing & strengthening coverage of vitamin A supplementation post partum, nutritional counseling & support & improvement of family planning utilization were recommended.

1. Introduction

1.1. Statement of the problem

Night blindness (XN)—the inability to see after dim light or at night—is the most common ocular manifestation of moderate to severe vitamin A deficiency. Poor dark adaptation leading to night blindness occurs when there is decreased production of a vitamin A–dependent photosensitive pigment, rhodopsin, in the retinal receptors responsible for seeing under low levels of illumination (rods). (1, 2)

Night blindness is common in vitamin A deficiency (VAD) endemic areas associated with poor intake of vitamin A rich foods. It occurs mainly when there is low vitamin A intake during nutritionally demanding periods in life, such as infancy, childhood, pregnancy and lactation, greatly raises the risk of health consequences, or vitamin A deficiency disorders (VADD). (2)

Night blindness is frequently reported in young children in developing countries, but only recently has it been recognized as a public health problem in women of reproductive age. (3)

Globally, night blindness affects 9.8 million women which correspond to 7.8% of the population at risk of VAD. A comparable and high proportion of women affected by night blindness are in Africa (9.8%) and South-East Asia (9.9%), each of which is estimated to have over 3 million pregnant women affected, or one third of the women affected globally. It has been estimated that more than 6 million women develop night blindness during pregnancy each year. The prevalence of night blindness is of moderate to severe public health significance in 66 countries. A maternal night blindness prevalence of ≥ 5% is recommended as a cut-off at which vitamin A deficiency may be considered a problem of public health significance within a community. (3, 4)

Ethiopia is among the countries with a significant night blindness problem among women who are at risk of vitamin A deficiency. The national prevalence of previous night blindness among women conducted in 2005 was 22.1%. In rural communities, 23.1% of women reported previous night blindness. In Tigray region, the prevalence of previous night blindness among women of 15-49 ages is 24.9%. (5-7)

Night blindness during pregnancy, caused by vitamin A deficiency, is also a marker of increased reproductive morbidity, protein-energy malnutrition, anemia, and elevated mortality in women and their infants. Night blind women were more susceptible to illness, both infectious (e.g. symptoms of urinary and possibly reproductive tract infections, diarrhea and dysentery) and non-infectious (e.g. symptoms of pre-eclampsia or eclampsia, and poor appetite, nausea and vomiting). (8, 9)

Night blindness is influenced by socioeconomic & demographic factors, weekly food intake, weekly morbidity history & other risk factors. But there is no enough evidence on the risk factors based on context of the study area. On the other hand, night blindness has never been assessed among lactating women at a community level in Tigray region particularly in the study area. (10)

Even though there is no adequate dietary pattern in Ethiopia particularly in rural communities, countries that improve the availability and intake of vitamin A through nutrition education to change dietary habits, as well as providing better access to vitamin A or provitamin A-rich foods, such as mangoes, papaya, or dark green leafy vegetables, fortification of a staple food or condiment with vitamin A & periodic delivery of high-potency vitamin A supplements to high risk groups indicated that there is reduction of night blindness risk to a large extent . (11)

Therefore, this study is designed to provide evidence on the prevalence of current night blindness & its associated factors among pregnant & lactating women so that it will be used by planners for improvement of the health of both women and their infants by targeting them in order to achieve a safe and nutritionally adequate intake of vitamin A during pregnancy and lactation period.

1.2. Literature Review

Maternal night blindness is marked by impairment in scotopic (dim light) vision during pregnancy that commonly recurs during repeated pregnancies and occasionally extends into the postpartum period. This ability for vision to adapt under dim illumination depends on efficient retinal rod cell production of a photosensitive pigment, rhodopsin that requires vitamin A (cis-retinal). Deficiency of vitamin A results in delayed adaptation to the dark and when, sufficiently severe, leads to night blindness. Night blindness appears during pregnancy, a likely consequence of preexisting, marginal maternal vitamin A status superimposed by nutritional demands of pregnancy and intercurrent infections. (8)

Association of night blindness with other indicators of vitamin A deficiency

Risk of maternal night blindness associated with other indicators of vitamin A deficiency. A case-control study in Nepal found that night-blind pregnant women had four times the odds [95% confidence interval (CI) = 2.2–7.4] of having low concentrations of serum retinol (< 0.7 μmol/L), three times the odds of having abnormal conjunctival impression cytology (95% CI = 1.3–6.1) and twice the odds (95% CI =1.1–3.6) of having low vitamin A concentrations in their breast milk after delivery than non night blind pregnant women. (12)

Furthermore, compared with normal pregnant women, the odds of abnormal dark adaptation scores among night-blind women were 3.3 (95% CI =1.8–6.0). Findings from a clinical trial in the Nepalese population showed that the incidence of maternal night blindness was markedly reduced (relative risk = 0.33, 95% CI = 0.18–0.59) with weekly vitamin A supplementation at normal dietary levels (seven recommended daily allowances given in one weekly combined dose), providing causal evidence that night blindness during pregnancy is a consequence of vitamin A deficiency. Compliance with vitamin A supplementation was associated with reduction in night blindness during pregnancy in a dose-response manner. A maternal history of night blindness during a recent pregnancy ending in a live birth is a practical, reliable, and valid indicator of vitamin A deficiency in a population.(12-15) Another study done in Brazil showed that

gestational night blindness is associated with low serum retinol levels (<1.05 µmol/L, p<0.000) in postpartum women. (16)

Magnitude of night blindness

Result from WHO showed that the prevalence of night blindness among women of pregnant in the last 3 to 5 years is 7.8% globally.(3)

A study carried out in rural Terai of Nepal on prevalence of night blindness among pregnant & lactating women found that 11.7% of pregnant & 3.7 % of pregnant & breast feeding reported being night-blind at the time of the interview & 16.2% lactating reported experiencing night blindness at some time during the pregnancy that produced the infant they were now breast-feeding. (17)

Other study from Cambodia national survey of ten provinces revealed that night blindness among lactating women ranged from 1.1-6.8% and the reported prevalence of night blindness during the last pregnancy in the previous 3 years ranged from 2.0-9.3%.(18)

Result from a study done in rural south India indicated that the prevalence of night blindness among pregnant women was 5.2%. (19)

A study conducted among women attending a Public Maternity Hospital in Rio de Janeiro, Brazil found that 17.9% prevalence of gestational night blindness. (20)

A national based studies done in Cameroon (2004), Mali (2001), Guinea (2005), Ghana (2003), Congo (2005), Zambia (2003), Uganda (2001) & Tanzania (2005) revealed that 6%, 19%, 17.8%, 7.7%, 8%, 5.7%, 8.3% & 2.7% prevalence of night blindness in the last pregnancy respectively. (3, 4)

In Ethiopia, a national survey study conducted in 2005 found that the prevalence of previous night blindness among women of 15-49 ages was 22.1%. Similarly, the prevalence was 23.1% among rural women & 24.9% in Tigray region. (5-7)

Factors associated with night blindness

Regarding factors associated with maternal night blindness, a study done in rural south India showed that having a concrete roof (OR: 0.60, 95% Confidence Interval (CI): 0.47, 0.78), religion other than Hindu (OR: 0.46, 95% CI: 0.27, 0.76), maternal literacy (OR: 0.58, 95% CI: 0.49, 0.69), and maternal age from 25 to 29 years (OR: 0.68, 95%CI: 0.50, 0.93) were associated with a lower risk of night blindness in pregnancy. The odds of night blindness were higher for those leasing land rather than owning land (OR: 1.78, 95%CI: 1.08, 2.93), parity 6 or more compared to 0 (OR: 2.11, 95% CI: 1.09, 4.08), and with twin pregnancies (OR: 3.23, 95% CI: 1.93, 5.41). (19)

A study carried out in rural Sarlahi district of Nepal found that the odds of night blindness in the current pregnancy were six times greater for women who reported night blindness in their previous pregnancy. Night-blind women were more likely to come from households with lower socioeconomic status. Teenage women and those over the age of 30 were at highest risk, particularly those of higher parity within these age groups. (17)

A case –control study conducted in rural Nepal reveals that night blindness was associated with less frequent consumption of preformed vitamin A (milk products, fish and meat) and provitamin A (dark green leafy vegetables and mangoes) foods, especially in summer. Night blind women were 2-3 times more likely to report symptoms of urinary/reproductive tract infections such as lower abdominal pain, painful and burning urination, or vaginal discharge, symptoms of diarrhea/dysentery, of pre eclampsia or eclampsia, and of nausea, vomiting or poor appetite throughout pregnancy than controls. (21)

Generally, the findings suggested that prevalence of night blindness is common public health problem in developing countries and night blindness is associated with low socioeconomic status, inadequate vitamin A rich foods intake and maternal related factors.

Conceptual framework

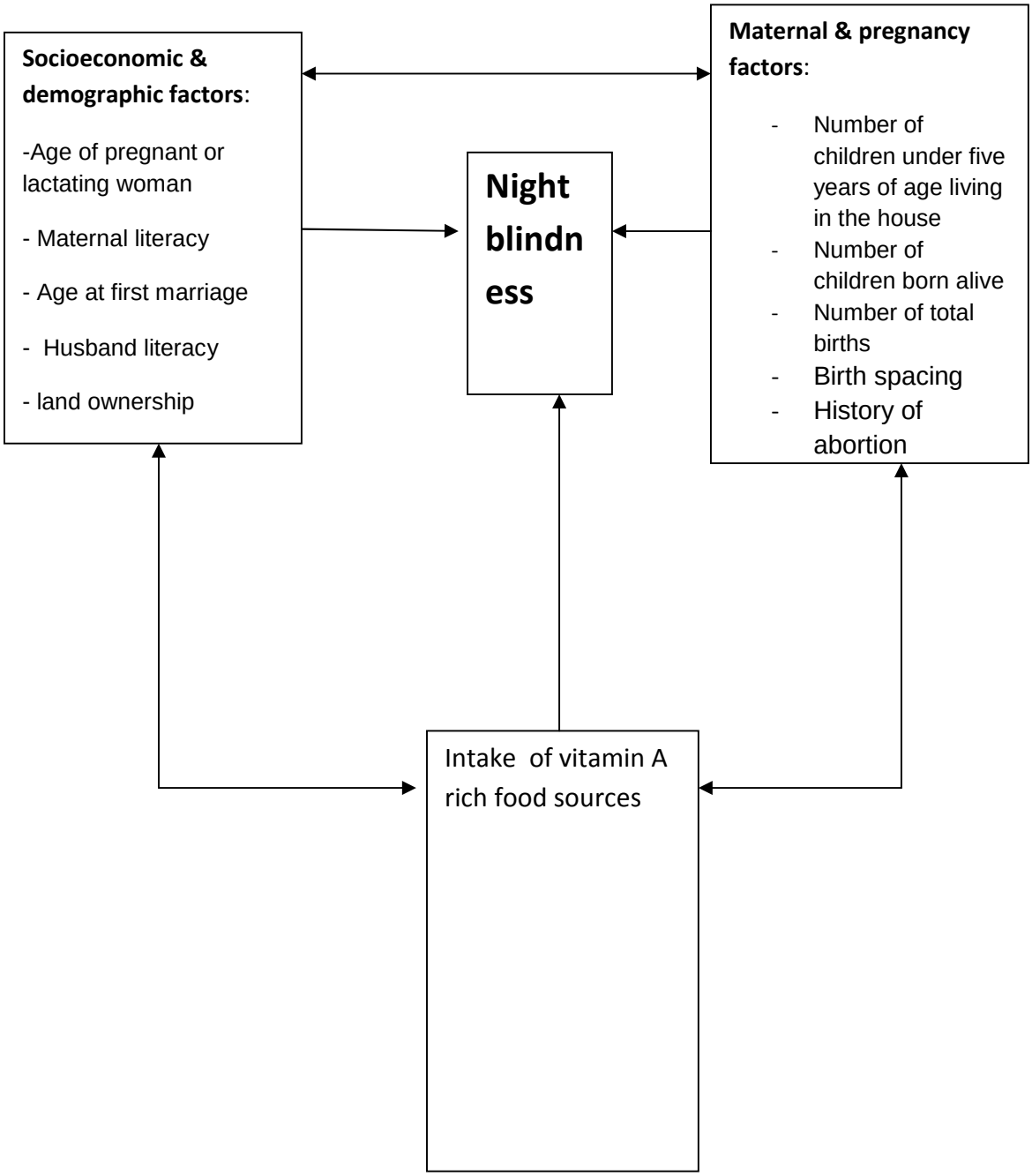

Figure 1: Conceptual framework for the study of night blindness

1.3. Justification of the study

When women are at pregnancy and lactation period, more energy and micronutrients are necessary to build up their health and needs of physiological changes. This is true when sufficient and necessary foods are available and intake practice is cultural. But, health consequences manifest from either lack of these foods or wrong perception towards regular usage.

Vitamin A is among the micronutrients needed during pregnancy & lactation. Night blindness is common in vulnerable groups such as pregnant & lactating women when there is vitamin A deficiency. Though earlier studies indicated that night blindness is significant public health problem among women in Ethiopia particularly in rural areas as determined using history of night blindness during last pregnancy, the extent to which factors related or influenced is not well established. Further, the burden of night blindness among lactating women who are among the vulnerable groups is not explored. Hence, the study is aimed to determine the prevalence of current night blindness and identify associated factors that facilitates planners or those involved in maternal health to give special focus on targeting the related factors in reduction of night blindness. It will also provide a base line data for further studies.

2. Objectives

2.1. General objective

- To assess the prevalence and associated factors of night blindness among pregnant and lactating women in Neader Adet woreda, 2012

2.2. Specific objectives

- To determine the prevalence of night blindness among pregnant & lactating women in Neader Adet woreda

- To identify factors associated with night blindness among pregnant & lactating women in Neader Adet woreda

3. Methods

3.1. Study design

A community based cross-sectional study design was employed.

3.2. Study area & period

The study was conducted in Neader Adet rural community among pregnant & lactating women from 26 March to 22 April, 2012.

Neader Adet is located in central zone of Tigray region, North Ethiopia. It is found 42 km away from Axum town to South on the way to Gondar. The source of economy in the area is mainly agriculture. The largest area has “kola” climate condition. It has a 104,542 total population from 2007 national census. Women cover 50.5% of the total population. The woreda contains 22 rural kebeles & one semi-town kebele. In the woreda, there are six health centers and eighteen health posts.

3.3. Source population

All pregnant & lactating women who reside in the woreda were used as source population to recruit the study population.

3.4.Study population

Women of age 15-49 who were pregnant and lactating and fulfill the inclusion criteria were the study population.

Inclusion criteria: Lactating women of age 15-49 who were breast feeding an infant less than 7month old and pregnant women of age 15-49.

Exclusion criteria: pregnant or lactating women either reported day & night time vision problem simultaneously or who were blind in both eyes.

3.5. Sample size & sampling procedure

Sample size was estimated using the single proportion formula assuming a 95% confidence interval (two sides), a 5% margin of error and 22 % proportion of previous night blindness among women (prevalence of previous night blindness in Ethiopia conducted in 2005).

$$n = \frac{(Z\ \alpha/2)^2 \times P\ (1-P)}{d^2}$$

Where n= sample size

P= night blindness proportion amon women

Z=standard normal distribution value at 95% Confidence level (1.96)

d= margin of error

Substituting the values, the result was 264.

Adding 10% non response rate and multiplying by two for design effect of using multistage sampling, a total sample size of 480 pregnant and lactating women was proposed.

The sample for each group was determined on the basis of proportional allocation to the size of the area population of the pregnant (Npreg =541) & lactating women (N_{lact}=364).

$n_{preg} = (n_f \times N_{preg})/N = (480x\ 541)/\ 905=287$

$n_{lact} = (n_f \times N_{lact})/N= (480\ X364)/905 =193$

The sample for pregnant and lactating women was 287 and 193 respectively giving a total of 480 individuals.

Sampling procedure: since the woreda covers wide area, multistage sampling stratified by women status (pregnant or lactating) was employed. After one area was selected, study subjects was selected by simple random sampling technique for each group after a fresh list of both pregnant and lactating women was prepared as obtained from health extension workers.

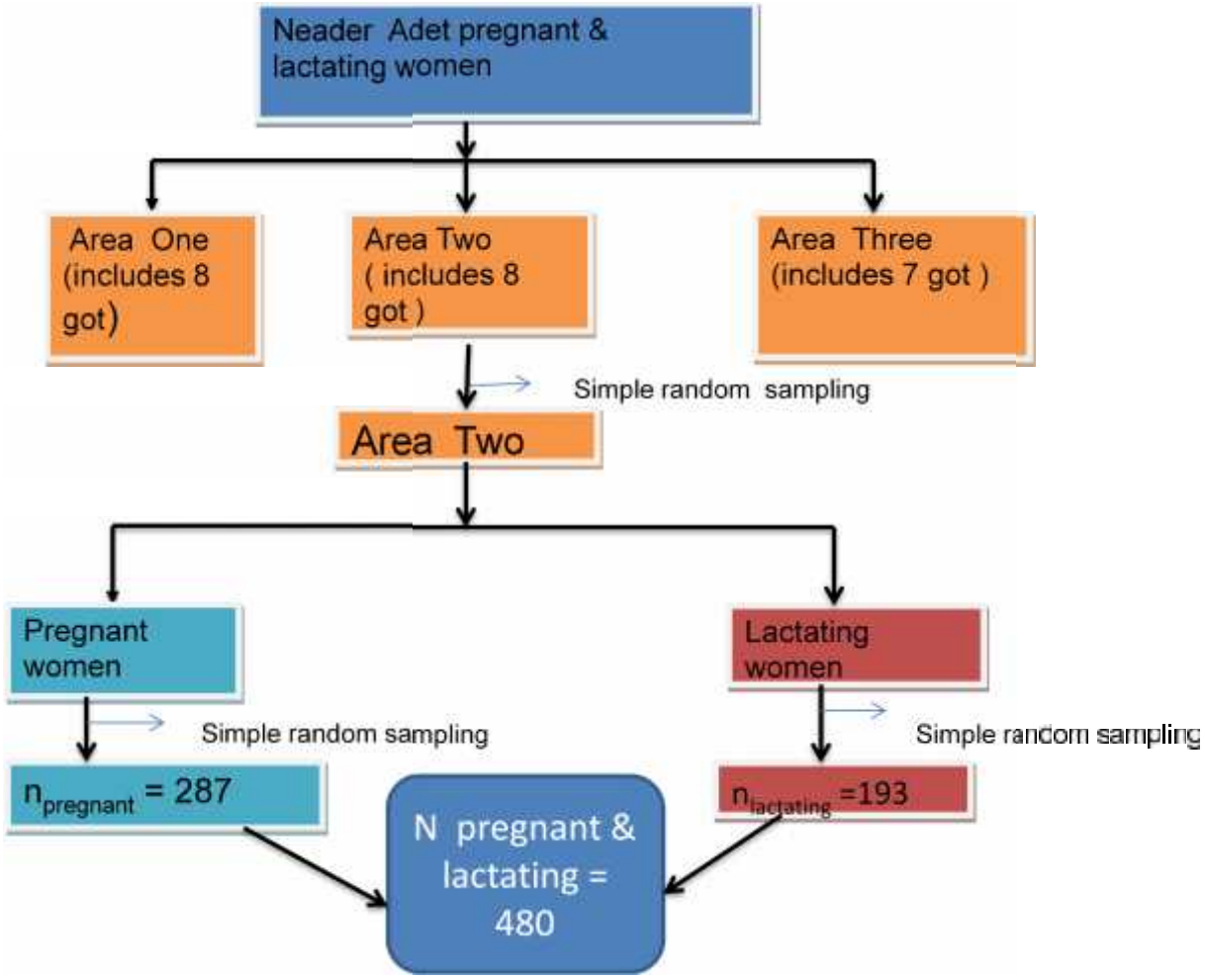

Figure 2: Schematic presentation of sampling framework

3.6. Study variable

3.6.1. Dependent variable

Night blindness (yes/no)

3.6.2. Independent variables

Socio-demographic and household factors: age of pregnant or lactating woman, maternal literacy, age at first marriage, marital status, religion, husband literacy, husband occupation, land ownership, cattle ownership, radio ownership, sanitation and distance to the household water source.

Maternal & pregnancy related factors: number of children under five years living in the house, women status (pregnant or lactating) ,number of children born alive, number of total births, birth spacing and history of abortion.

Intake of vitamin A rich food sources : milk & milk products, egg , animal origin foods like liver, kidney & dark green leaves such as pumpkin, mango, papaya

3.7. Operational definitions

Night blindness- study subjects are considered as having night blindness when they answered “no” to question 1 and “yes” to question 2 and /or 3 in either eye at any time during pregnancy or lactation period for pregnant and lactating women respectively using WHO standard questions: (i) do you have difficulty seeing during the day?; (ii) do you have difficulty seeing with decreased light or at night?; (iii) do you have “hima” (a local term for night blindness)? (10)

Adequate vitamin A diet intake when there is intake of vitamin A-rich foods such as milk & its product, egg & animal origin foods and dark green leaves three or more times per week together. (10)

Sanitation is **adequate** when the house hold has waste disposal collection site, functional latrine and women wash their hand with soap after use of latrine. (22)

Total births are the sum of live & still births.

3.8. Data collection procedure

Data were collected using a pre-tested and structured interview administered questionnaire. The questionnaire include socio-demographic and house hold, diet and maternal & pregnancy related characteristics. The questionnaire was first developed in English and then translated in to Tigrigna and back translated to English to check its consistency. Five percent of the questionnaires were tested in Edaga-berhe locality, from nearby woreda, and the necessary adjustments were made prior to the actual study time. Data collection was undertaken by six female health extension workers who had a certificate in health extension package. These interviewers were recruited from the same woreda. Supervision of data collectors was performed by two supervisors who had diploma in nurse. These supervisors were assigned to assist the data collection process & carry out a reliability test on a small number of randomly selected subjects. A day to day supervision was made during the whole period of data collection. The overall activity was coordinated by the investigator. At the end of each day, the questionnaire was revised and checked for completeness and consistency.

3.9. Data quality control

Pre test was conducted in Edaga-berhe locality to check the accuracy and validity of the questionnaire prior to the actual study period. A one day training on how to interview & collect the required data was given for data collectors and supervisors . The principal investigator and supervisors made day to day visit at study and supervised data collection and handle the questionnaires. At the end of each day, the questionnaires were checked for completeness and consistency and were submitted to the principal investigator.

3.10. Data processing and analysis

Data was entered into computer and cleaned, edited and analyzed using SPSS version 16 statistical package. Data cleaning was performed to check for accuracy and consistencies and missed values and variables. Errors identified during data entry were corrected after revision of the original completed questionnaire. The cleaned and edited data was ready for appropriate statistical analysis. Descriptive statistics such as frequency distribution, percentage, mean and standard deviation with tabular presentation were used for summarizing the descriptive finding of the variables as necessary. Cross tabulation was done for consistency check. Statistical association was assessed using bivariate and multivariate logistic regression indicating odds ratios and 95% confidence limits. In this paper, P-value less than or equal to 5% was taken as statistically significant. The result of the analysis was presented using tables.

3.11. Ethical consideration

Ethical clearance was obtained from the Ethical Review Board of University of Gondar and permission & supporting letter were obtained from woreda's health office and administrative. The purpose and importance of the study was explained to the participants. Data was collected after full informed verbal consent was obtained and confidentiality of the information was maintained by omitting their names and personal identification or privacy. Those subjects refused to participate were respected their willingness.

4. Results

4.1. Socio-demographic and household characteristics

A total of 470 pregnant (280) and lactating (190) women (response rate 97.9%) responded to the questionnaire. of these, seven subjects (3 pregnant & 4 lactating) were excluded since they reported both day & night vision problem together so their night blindness status were unknown.

The mean age for both pregnant & lactating women was 27.8 years with a standard deviation of 6.4 years. The mean age for each pregnant & lactating women was 28.2 years and 27.2 years with a standard deviation of 6.3 years and 6.5 years respectively. The mean age at first marriage for both pregnant & lactating women was 17.7 years with a standard deviation of 2.3 years.

Majority of the pregnant & lactating women (97.6%) were Orthodox Christians. 87.3 % of both pregnant & lactating women were lived with their partner. Half of both pregnant (47.7%) and lactating (45.2%) were illiterate. Subsistence farming was the main occupation husbands. The distribution of the socio-demographic & house hold characteristics of the respondents is presented in Table 1.

Table1: Socio-demographic & house hold characteristics of pregnant (n=277) & lactating (n=186) women with current night blindness prevalence ,Neader Adet woreda, North Ethiopia, April 2012

Characteristics	Pregnant		Lactating	
	n(%)	XN prevalence [n(%)]	n(%)	XN prevalence [n(%)]
Age (in years)				
<25	84(30.3)	14(16.7)	76(40.8)	5(6.6)
25 - 35	146(52.7)	29(19.9)	83(44.6)	15(18.1)
>35	47(17.0)	16(34.0)	27(14.6)	7(25.9)
Age at first marriage(in years)				
<18	144(51.9)	33(22.9)	78(41.9)	9(11.5)
≥18	133(48.1)	26(19.5)	108(58.1)	18(16.7)
Religion				
Orthodox Christian	272 (98.2)	59(21.7)	180 (96.8)	27(15)
Muslim	5 (1.8)	0(0)	6 (3.2)	0(0)
Marital status				
Live with partner	240 (86.6)	46(19.2)	164 (88.1)	24(14.6)
Separated	21(7.6)	8(38.1)	20 (10.8)	3(15)
Divorced	8 (2.9)	2(25)	2 (1.1)	0(0)
Widowed	8 (2.9)	3(37.5)		
Maternal literacy				
Illiterate	132 (47.7)	40(30.3)	84 (45.2)	15(17.9)
Can read and write	36 (13.0)	7(19.4)	13 (7.0)	2(15.4)
Elementary school & above	109 (39.3)	12(11.0)	89 (47.8)	10(11.2)
Husband literacy				
Illiterate	91(32.9)	34(37.4)	56 (30.2)	8(14.3)
Can read and write	40(14.4)	8(20.0)	34 (18.3)	9(26.5)
Elementary school & above	146 (52.7)	17(11.6)	62 (33.3)	10(10.4)
Husband occupation				
Subsistence farming	196(70.8)	42(21.4)	141(75.8)	20(14.2)
Trade/salesman	30(10.80)	9(30)	12 (6.5)	2(16.7)
Government employee	26(9.4)	4(15.4)	20 (10.7)	3(15)
Others	25 (9.0)	4(16)	13 (7.0)	2(15.4)
Cattle ownership				
None	59 (21.3)	13(22)	35 (18.8)	8(22.9)
One	72 (26.0)	15(20.8)	30 (16.1)	3(10)
Two or more	146 (52.7)	31(21.2)	121(65.1)	16(13.2)
Land ownership (< or=0.5hectar)				
Own	157 (56.7)	23(14.6)	109 (58.6)	15(13.8)
None	120 (43.3)	36(30)	77 (41.6)	12(15.6)
Radio ownership				
Yes	146(52.7)	21(14.4)	81(43.5)	6(7.4)
No	131(47.3)	38(29)	105 (56.5)	21(20)
Distance to water source (in minute)				
Less than 15	78 (28.2)	7(9)	56(30.1)	4(7.1)
15-30	146(52.7)	35(24)	79 (42.5)	5(6.3)

Greater than 30	53(19.1)	17(32.1)	51 (27.4)	18(35.3)
Sanitation				
Adequate	158 (57.0)	33(20.9)	106(57.0)	12(11.3)
Inadequate	119 (43.0)	26(21.8)	80 (43.0)	15(18.8)

4.2. Maternal and diet characteristics

Forty-seven percent of both pregnant (48.3%) & lactating(44.1%) women had one under five years children in the house. The corresponding percent of pregnant & lactating who had three or more children born alive was 51.3% & 49.5% respectively. In this study, 6.1% of pregnant & 13.4% lactating women had experienced six or more total births. Majority of pregnant (66.8 %) & lactating (63.4%) women had three year birth spacing pattern. Greater than two-third of pregnant (81.6 %) & lactating (76.3%) had inadequate intake of vitamin A food sources. From the total of 375 both pregnant & lactating women with history of pregnancy in the last five years, 120 (32%) of women had experienced night blindness. The maternal & diet characteristics of the respondents is given in Table 2.

Table2: Maternal & diet characteristics of pregnant (n=277) & lactating (n=186) women ,Neader Adet woreda, North Ethiopia, April 2012

Characteristics	**Pregnant**		**Lactating**	
	n(%)	XN prevalence [n(%)]	n(%)	XN prevalence [n(%)]
Number of <5 years children				
0	62 (22.4)	6(9.7)		
1	134(48.3)	30(22.4)	82 (44.1)	6(7.3)
2	50 (18.1)	13(26)	95 (51.1)	17(17.9)
3 or more	31 (11.2)	10(32.3)	9 (4.8)	4(44.4)
Number of children born alive				
0 or 1	74 (26.7)	7(9.5)	50 (26.9)	3(6)
2	61(22.0)	6(9.8)	44 (23.6)	5(11.4)
3 or more	142 (51.3)	46(32.4)	92 (49.5)	19(20.70)
Number of total births				
0 or 1	63 (22.7)	6(9.5)	48 (25.8)	3(6.2)
2 or 3	122 (44.1)	20(16.4)	67 (36.1)	7(10.4)
4 or 5	75 (27.1)	26(34.7)	46 (24.7)	11(23.9)
6 or more	17 (6.1)	7(41.2)	25 (13.4)	6(24)
Years of birth spacing				
Less than or equal two	22 (7.9)	9(40.9)	32(17.2)	11(34.4)
Three	185 (66.8)	38(20.5)	118 (63.4)	13(11)
Four or more	70 (25.3)	12(17.1)	36(19.4)	3(8.3)

History of abortion				
Yes	70(21.7)	13(21.7)	45 (24.2)	7(15.6)
No	217 (78.3)	46(21.2)	141 (75.8)	20(14.2)
History of previous XN during last five years pregnancy*				
Yes	62(26.3)	29(46.8)	58(41.7)	22(37.9)
No	174(73.7)	25(14.4)	81(58.3)	4(4.9)
Vitamin A intake				
Adequate	51(18.4)	3(5.9)	44(23.7)	2(4.5)
Inadequate	226 (81.6)	56(24.8)	142(76.3)	25(17.6)

* For lactating women, exclude pregnancy of currently breast feeding infant

4.3. Occurrence and characteristics of current night blindness

Among 463 both pregnant & lactating women, 86 (18.6%) reported having current night blindness. Of these, 59 (21.3%) were pregnant & 27 (14.5%) were lactating women. Of the 59 pregnant women with current night blindness, 28 (47.5%) & 24 (40.7%) of women reported current night blindness was started during the 2nd & 3rd three months of the pregnancy period respectively. In lactating women with current night blindness, 25 (92.6%) of women reported night blindness was started during first month of lactation period following delivery. Among those currently breast-feeding an infant <7mo old, 39 (21%) reported being night blind at some time during the pregnancy that produced the infant now being breast-fed. The occurrence & characteristics of current night blindness is shown in Table 3.

Table3: Occurrence (prevalence rate) & characteristics of current night blindness among pregnant & lactating women ,Neader Adet woreda, North Ethiopia, April 2012

Characteristics	Frequency	Percent(%)
Current night blindness(n=463)		
Yes	86	18.6
No	377	81.4
Night blindness among pregnant (n=277)		
Yes	59	21.3
No	218	78.7
Night blindness among lactating (n=186)		
Yes	27	14.5
No	159	85.5
Occurrence of night blindness		
Pregnant		
1st three months	7	11.8
2nd three months	28	47.5
3rd three months	24	40.7
Lactating		
1st month	25	92.6
2nd month	2	7.4
XN during pregnancy of infant currently breast feeding		
Yes	39	21.0
No	147	79.0

4.4. Factors associated with night blindness

Both bivariate & multivariate analyses were performed to investigate the association of dependent variable (current night blindness) with socio-demographic, house hold, maternal & diet independent variables. The independent variables considered were: age of pregnant or lactating woman, maternal literacy, age at first marriage, husband literacy, husband occupation, land ownership, cattle ownership, radio ownership, sanitation , distance to the household water source, number of children under five years of age living in the house , number of children born alive , number of total births, women status, birth spacing, history of abortion, vitamin A intake & history of previous XN during last five years pregnancy.

To see the association of each independent variable, several different bivariate analyses were performed. Accordingly, age of woman, maternal literacy, husband

literacy, land ownership, radio ownership, distance to water source, number of children born alive, birth spacing , number of total births, vitamin A intake & history previous night blindness in the last five years pregnancy were found to be highly significantly associated with current night blindness (the P-values were less than 0.05). Number of under five years children & woman status showed association with night blindness at the 0.20 & 0.10 level of significance respectively. Age at first marriage of women, husband occupation, cattle ownership, sanitation & history of abortion did not show association with night blindness of the pregnant women (each of these variable had P-value of greater than 0.4 except sanitation).

At the end, those predictor variables that were significantly associated with night blindness at a 0.2 level of significance from the bivariate analyses were entered into the multivariate logistic regression model. After the back ward stepwise multivariate logistic regression used, husband literacy, woman status, distance of water source to house hold (in minutes), number of children born alive, land ownership & history of previous night blindness in the last five years pregnancy were found significantly associated with presence or absence of current night blindness among the thirteen predictor variables included in the multivariate logistic analysis.

This study showed that lactating women were 0.487 times less likely to have night blindness compared to pregnant women[AOR=0.487; 95% CI: (0.252,0.940)]. Further, pregnant & lactating women whose husband attended elementary school & above were 0.333 times less likely to be night blind than women whose husband were illiterate [AOR=0.333; 95%CI:(0.170,0.654)]. In addition, those women who did not own land were 3.95 times more likely to have night blindness than those who own land [AOR=3.952; 95% CI: (2.103,7.424)]. Pregnant & lactating women who did not report night blindness in their last five years pregnancy were 0.179 times less likely to have night blindness during current pregnancy or lactation than those who reported night blindness in their previous pregnancy [AOR= 0.179 ; 95% CI: (0.094,0.339)]. Moreover, those women who reported fetch water for greater than 30 minute were 3.93 times more likely to develop night blindness compared to women who fetch water less than 15 minute [AOR=3.93;95%CI: (1.625,9.510)]. Pregnant & lactating women who had not or one &

three or more live births were at risk to have night blindness than women who had two live births. The findings are summarized in table 4.

Table 4: Result of bivariate & multivariate (adjusted for different variables) logistic regression showing the effect of different variables on the presence or absence of current night blindness among both pregnant & lactating women ,Neader Adet woreda, North Ethiopia, April 2012

Explanatory variable	Night blindness		Crude OR(95% CI)	Adjusted OR(95% CI)
	Yes	No		
Age (years)			(0.003)*	
<25	19	141	1.00	
25 - 35	44	185	1.765 (0.987, 3.155)	
>35	23	51	3.347 (1.684,6.652)	
First marriage age (years)				
<18	42	180	1.00	
≥18	44	197	0.957 (0.599,1.529)	
Maternal literacy			(0.001)*	
Illiterate	55	161	1.00	
Only read &write	9	40	0.659 (0.300,1.444)	
Elementary school & above	22	176	0.366 (0.214,0.627)	
Husband literacy			(<0.001)*	(0.006)*
Illiterate	42	105	1.00	1.00
Only read &write	17	57	0.746 (0.390,1.427)	0.709 (0.309,1.629)
Elementary school & above	27	215	0.314 (0.184,0.537)	0.333 (0.170,0.654)[a]
Cattle ownership			(0.577)*	
None	21	73	1.00	
One	18	84	0.745 (0.369,1.505)	
Two or more	47	220	0.743 (0.416,1.324)	
Land ownership				
Own	38	228	1.00	1.00
None	48	149	1.933 (1.204,3.102)	3.952 (2.103,7.424)[a]
Radio ownership				
Yes	27	200	1.00	
No	59	177	2.469 (1.500,4.064)	
Distance to water source (minutes)			(<0.001)*	(0.005)*
< 15	11	123	1.00	1.00
15 - 30	40	185	2.418 (1.194,4.894)	1.691 (0.729,3.919)
>30	35	69	5.672 (2.709,11.874)	3.930 (1.625,9.510)[b]
Sanitation	45	219	1.00	
Adequate	41	158	1.263 (0.789,2.021)	
Inadequate			(0.014)*	
Number of < 5 years				

children	6	56	1.00		
0	36	180	1.867 (0.748,4.660)		
1	30	115	2.435 (0.958,6.189)		
2	14	26	5.026 (1.735,14.556)		
3 or more					
Number of children			(<0.001)*		(0.001)*[a]
born alive	10	114	1.00		
0 or 1	11	94	1.334 (0.543,3.277)	1.00	
2	65	169	4.385 (2.162,8.890)	0.443	(0.136,1.444)
3 or more			(<0.001)*	2.042	(0.764,5.454)
Number of total births	9	102	1.00		
0 or 1	27	162	1.889 (0.854,4.179)		
2 or 3	37	84	4.992 (2.280,10.929)		
4 or 5	13	29	5.080 (1.972,13.067)		
6 & above			(0.001)*		
Birth spacing	20	34	1.00		
< or equal two	51	252	0.344 (0.183,0.645)		
Three	15	91	0.280 (0.129,0.609)		
Four or more					
History of abortion	20	85	1.00		
Yes	66	292	0.961 (0.551,1.674)		
No					
Vitamin A intake	5	90	1.00		
Adequate	81	287	5.080 (1.997,12.923)		
Inadequate					
History of previous XN	51	69	1.00		
Yes	29	226	0.174 (0.102,0.295)	1.00	
No			(0.547)*	0.179	(0.094,0.339)[a]
Husband occupation	62	275	1.00		
Subsistence farming	11	31	1.202 (0.482,3.001)		
Trade	7	39	1.892 (0.623,5.746)		
Government employee	6	32	0.957 (0.292,3.135)		
Others					
Woman status	59	218	1.00		
Pregnant	27	159	0.627 (0.381,1.034)	1.00	
Lactating				0.487	(0.252,0.940)[c]

* the overall significance of variables with more than two categories

a: significant at P - value ≤0.001

b: significant at P - value= 0.002

c: significant at P - value= 0.032

5. Discussion

This study has shown that more than 45 % of pregnant & lactating women were illiterate which indicate the impact of illiteracy on the socio-economic & political growth of women.(22) Majority of women (86%) had at least one child under 5 years to take care of which is similar to other studies conducted elsewhere in Ethiopia. (22) Further, greater than two-third of pregnant & lactating women had inadequate intake of vitamin A food sources that may be due to limited food supply, low consumption , lack of food diversity or culture norm practices.(23)

The overall prevalence of current night blindness among pregnant & lactating women was 18.6%, 21.3% for pregnant and 14.5 % for lactating women, that meets the 5% cut off for the definition of a public health problem at which vitamin A deficiency may be considered to be a problem of public health significance within the community.(10). As earlier studies established that night blindness during pregnancy or lactation is strongly associated with low serum and breast milk vitamin A concentration, abnormal conjunctival impression cytology and impaired dark adaptation (12), this study suggest there is chronic vitamin A deficiency among pregnant & lactating women in the region particularly in the study area.

Pregnant & lactating women with history of night blindness in previous last five years pregnancy, illiterate husband, lack of land ownership, had not or one & 3 or more live births and fetch water greater than 30 minute were at higher risk of having night blindness. Lactating women were at lower risk compared to pregnant women.

The prevalence was higher compared to prevalence for the globe (7.8%) & Africa region (9.4%) as determined using reported women's history of night blindness during their most recent pregnancy in the previous 3–5 years that ended in a live birth from prevalence surveys conducted between 1995 and 2005.(4). But the prevalence was comparable to the national prevalence (22.1%) conducted in 2005. Similarly, the rate was in consistent to the prevalence among rural Ethiopian women (23.1%) & in Tigray region (24.9%). The result may suggest that the area is endemic for vitamin A deficiency. (4, 6, 15)

Similar study conducted in rural Terai Nepal showed lower prevalence of night blindness (7%) among pregnant & lactating women to the present study. (17) This might be due partly to implementation of treatment for vitamin A deficiency.

A study conducted in rural South India indicated that the prevalence of night blindness during pregnancy (5.2%) among women at delivery was lower compared to the current prevalence of night blindness among pregnant women. (19) The possible reasons could be large sample size was used by the study.

In this study, the prevalence of night blindness among pregnant women was comparable to the result reported from a study conducted in Rio de Janeiro, Brazil which noted that the prevalence of gestational night blindness among postpartum women attending a public maternity hospital was 17.9%.(16)

The prevalence of night blindness among lactating was higher compare to a study reported from the National Micronutrient Survey of Cambodia that ranged from 1.0 to 6.8% with weighted rate of 2%.(18)This may be due to the difference in the selection of study subjects. In this study, lactating women breast feeding an infant less than seven months old were included but Cambodia study included till less than 24 months old .

In this study, pregnant or lactating women who experienced night blindness in the previous pregnancy were more susceptible to night blindness at current pregnancy or lactation. Similar findings were reported from a study conducted in rural Terai Nepal (17) and Cambodia (18). These findings support the idea that women with repeated pregnancies have marginal vitamin A status so that night blindness recurs in next pregnancy when nutritional demand of pregnancy becomes in need. (4)

As for the literacy of husband, the study showed that the risk of night blindness at current pregnancy or lactation reduces as the level of husband literacy increased. Similar result was reflected from a study in rural Terai Nepal.(17) Though literacy of husband showed association with night blindness in bivariate analysis, the association did not maintain after adjusted for other variables (a study from rural South India) (19)

The current study indicated that pregnant or lactating women who did not own land were at higher risk of night blindness than women own land [AOR=3.952; 95% CI: (2.103,7.424)] which is consistency with the study reported from rural South India; pregnant women who had lease land were 1.78 times more likely to have night blindness rather than owning land [AOR: 1.78, 95%CI: (1.08, 2.93)].(19) Another finding from Nepal showed similar result. (20)

A study conducted in rural Terai Nepal revealed that women in households whose water supply was five or more minute walk from the house were at increased risk of night blindness [AOR=3.25; 95%CI:(1.46,7.23)]. (17) This was found to be in agreement with the current study; women who reported fetch water greater than 30 minute were 3.93 times more likely to develop night blindness compared to women that fetch water less than 15 minute[AOR=3.93;95%CI: (1.625,9.510)].

Though this study did not identify the interaction of number of children born alive with other associated variables, the finding indicates that pregnant women who had not or one & 3 or more live births were more likely to have night blindness. However, the result from rural Terai Nepal did not show association of number of live births with night blindness after adjusted for maternal age.

A study done in India indicated that night blindness disappear immediately after delivery.(24) Similar exposure to night blindness was also observed in this study; lactating women were 0.487 times less likely to be night blindness compared to pregnant women [AOR=0.487; 95% CI: (0.252,0.940)].

A study conducted in Cambodia found that lactating women owned ≤ 0.5 hectare land (OR 1.4, 95% CI 1.0–1.9), had >3 parity (OR 1.5, 95% CI 1.0–2.1), & lack of consumption of Vitamin A-rich animal foods last 24 h were associated with night blindness.(18) In the present study, intake of vitamin A -rich food sources did not maintain association with night blindness after adjusted for other variables due to small number in one of the cells.

This study had determined the extent of night blindness among pregnant & lactating women and indicated the possible risk factors associated with night blindness.

5.1. Limitations of the study

- Report bias of night blindness by pregnant or lactating women

- Other factors such as pre-gestation height & body mass index, weight gain during pregnancy & morbidity (diarrhea, dysentery, pre-eclempsia & Nausea/ vomiting/ poor appetite) were not assessed.

6. Conclusion and recommendation

6.1. Conclusion

1. The study justifies that the prevalence (18.6%) of night blindness observed among pregnant & lactating women of Neader Adet woreda, Tigray Region underlines that vitamin A deficiency is a major problem & call the attention of health professionals in primary healthcare facilities to the public-health dimension of vitamin A deficiency, and the need to address it
2. History of night blindness in previous pregnancy, illiterate husband , lack of land ownership, fetch water greater than 30 minute & had not or one & 3 or more children bore alive were predictors for night blindness among pregnant & lactating women
3. Pregnant women were at higher risk of night blindness compared to lactating women

6.2. Recommendations

1. The regional and woreda health office should increase & strengthen the coverage of vitamin A supplementation post partum particular attention to pregnant & lactating women with history of night blindness in previous pregnancy
2. Health professional involved in antenatal care need to give special attention to diagnosis of night blindness during antenatal care
3. The woreda health office in collaboration with the woreda agricultural & rural development should implement nutritional counseling & support with special attention to pregnant & lactating women
4. Pregnant & lactating women with 3 or more children born alive should utilize family planning
5. The woreda administrative should work hard to increase social welfare such as water access & fair distribution of land
6. Health professional involved in antenatal care including health extension workers should provide nutrition education on dietary vitamin A intake particularly food sources rich in vitamin A to the community at large

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8. Annexes

Annex I: English version questionnaire

University of Gondar

College of Medicine and Health Science

Institute of public health

Questionnaire form to assess prevalence & associated factors of night blindness among pregnant and lactating women of Neader Adet woreda

Verbal consent form

Greeting

How are you? I am----------. I am working with Ato Kbrom Legesse, who is doing a research as partial fulfillment for the requirement of Master of public health at University of Gondar. I would like to ask you questions related to your status of night blindness. Hence, you are kindly requested to reply genuine information since it helps planners to identify the extent of the problem and to act accordingly in order to reduce the burden of the problem. Your name will not be written in this form and will never be used in connection with any information you tell us. All information given by you will be kept strictly confidential. Your participation is voluntary and you are not obligate to answer any question you do not wish to answer. IF you fill discomfort with the interview, please feel free to drop out any time you want. This interview will take about 25 minutes. Could I have your permission to continue?

1. Yes 2. No

Informed consent Certified by

Interviewer: Code----------Name----------signature----------

Date of interview----------Time started---------- Time completed-------

Result of interview: 1. Completed 2.Partially completed 3. Refused

Checked by:

Supervisor Name----------signature----------Date----------

Questionnaire identification number----------

Part I Socio- demographic & house hold characteristics of respondents
Please circle your response from the possible alternatives or fill in the provide space

No	Question	Possible responses	Code	Remark
401	Age	---------- in years		
402	Religion	1. Orthodox 2. Muslim 3. Others, specify----------		
403	Marital status	1. Live with partner 2. Separated 3. Divorced 4. Widowed		Separated-her husband temporary lives in other place for different reasons
404	What was your age when you married first?	**----------**in years		
405	Maternal literacy	1. Illiterate 2. Can read and write 3. Elementary school(1-8) 4. High school(9- 12) 5. Above high school		
406	Husband literacy	1. Illiterate 2. Can read and write 3. Elementary school(1-8) 4. High school(9-12) 5. Above high school		
407	Husband occupation	1. Subsistence farming 2. Trade/salesman 3. Government employee 4. Others, specify----------		
408	Cattle ownership	1.None 2.One 3.Two or more		Sum of goat, cow & sheep
409	Land ownership	1.Own 2.Lease 3.None		< or= 0.5 hectare
410	Radio ownership	1.Yes 2.No		
411	Distance to the house hold water source (time in	1.Less than 15 2.15-30 3.Greater than 30		Without time lost to stay there

	minute)			
412	Do you have a regular waste disposal collection site?	1.Yes 2.No		
413	Do you have functional latrine?	1.Yes 2.No		
414	How often did you wash your hand with soap after using latrine?	1.none 2.washed only when want to wash 3.regularly washed		

Part II-Respondents' status of night blindness

Please circle your response from the possible alternatives

No	Question	Possible response	Code	Remark
415	Do you have difficulty seeing during the day?	1.Yes 2.No		
416	Do you have difficulty seeing with decreased light or at night?	1.Yes 2.No		
417	Do you have "hima" (a local term for night blindness)?	1.Yes 2.No		
418	Did you experience night blindness (hima) in previous five year pregnancy?	1.Yes 2.No		For lactating women-pregnancy other than currently breast fed infant
419	For pregnant women that reported yes in Q 416 and /or 417, when was night blindness (hima) occurred during the period of pregnancy?	1 .First three month 2. Second three month 3. Third three month		
420	For lactating women reported yes in Q 416 and /or 417, when was night blindness (hima) occurred during the	1.First month 2.Second month 3.Third month 4.Fourth month 5.Fivth month 6. Sixth month		

	period of lactation?(months post partum)			
421	For lactating women, do you experience night blindness (hima) during pregnancy of the child that you are currently breast-feeding?	1.Yes 2.No		

Part III- Maternal , pregnancy & diet characteristics of respondents

Please circle your response from the possible alternatives

No	Question	Possible responses	Code	Remark
422	How many children do have less than five years in the house?	1.0 2.1 3.2 4. Three or more		
423	How many children born alive?	1.0 2.1 3.2 4. Three or more		
424	How many total births did you encounter?	1.0 2.1 3.2 or 3 4. 4 or 5 5. 6 or more		
425	What is your regular birth spacing? (in years)	1. Less than or equal two 2. Three 3. Four or more		
426	Did you have history of abortion in your life?	1.Yes 2. No		Induced or spontaneous
427	How often do you regularly take adequate amount of milk and its products per week?	1.None 2. Once 3. Twice 4. Three times or more		At least half liter
428	How often do you regularly take adequate amount of	1.None 2. Once 3. Twice		

	egg per week?	4. Three times or more		
429	How often do you regularly take adequate amount of animal origin foods such as liver, kidney per week?	1.None 2.Once 3.Twice 4. Three times or more		
430	How often do you regularly take adequate amount of dark green leaves such as pumpkin, mango, papaya per week?	1.None 2.Once 3.Twice 4. Three times or more		
431	How often do you regularly take adequate amount of yellow vegetables & fruits such as orange, carrot per week?	1.None 2.Once 3.Twice 4. Three times or more		

Thank you for your kind cooperation

Annex II: Tigrigna version questionnaire

ጎንደር ሕክምናን ጥዕና ሳይንስን ኮሌጅ

ምርምር ማዕከል ሓለዋ ጥዕና ሕብረተሰብ

መጠንን ጠንቅን ህማ አብ ጥኡሳትን ዕሸል መጥበውትን ኣዴታት ነበርቲ ናዕዴር ዓዴት ንምፅናዕ ዝተዳለወ ቃለ- መሕተቲ ቅፅዒ

መጠየቂ ፍቃድ ተሳተፍቲ ፅንዓት

ሰላምታ: ጥዒና ይሃበለይ

ሹመይ _____ ይበሃል፡፡ አነ ሓጋዚ ፅንዓት እንትከውን ንዋና አፅናዒ ክብሮም ለገሰ ካብ ተሳተፍቲ ፅንዓት ሓበሬታ ሰብሳቢ እየ፡፡ ክብሮም ለገሰ ናይ ሕብረተሰብ ጥዕና ማስተርስ ዲግሪ አብ ጎንደር ዩኒቨርሲቲ ተማሃራይ እዩ፡፡ዕላማ እዚ ፅንዓት መጠንን ጠንቅን ህማ አብ ጥኡሳትን መጥበውቲ ዕሸልን ንምፅናዕ እንትከውን ካብዚ ፅንዓት ብምምስራት ነቲ ዘሎ ክፍተት ንምምላእ ንመዳለውቲ ሓለዋ ጥዕና ኣዴታት ከም ሓደ ግብኣት ይጠቅም፡፡ ስለዚ ኩነታት ህማ ምህላዉን ዘይምህላዉን ንምፍላጥ ዝተወሰኑ ሕቶታት ክሓተኪ ስለዝደሊ ብተሳትፎ ንክተሓባበርኒ ይጥይቀኪ ኣለኩ፡፡ ሽምኪ ምጽሓፍ አየድልን፡ንማንም ዓይነት ሓበሬታ ብምስጢር ዝተሓለወ እዩ፡፡ተሳትፎ ብፍቃድኪ እዩ;ደስ እተዘይሉኪ አብ ማንም ሰዓት አቋሪጽኪ ምካድ ትክእሊ ኢኪ፤ንቃለ-መሕተቲ ክባቢ 25 ደቂቃ እዩ ዝወስድ እንድሕር ፍቃድኪ ኮይኑ ክቅጽል ዶ?

1. እሺ ተኮይኑ ቀጽል

2. ፍቃደኛ እንተዘይኮይና ናብ ካሊእ ሕለፍ

ፍቃደኛ ምኻና ዘረጋግጽ አካል

ጠያቂ:
ኮድ_____ሹም_____ፊርማ

ተዓዛቢ:
ሹም_____ፊርማ

ዝተጠየቀሉ ዕለት_____

ናይ ቃለ-መሕተቲ መፍለዪ ቁጽሪ_____

ክፍሊ ሓደ: ብዛዕባ ማሕበራዊ ስነ-ህዝብን ኩነታት ገዛን ዝምልከት ሓበሬታ ተሳተፍቲ ፅንዓት

ነዞም ዝስዕቡ ሕቶታት ክከውን ዝኽእል መልሲ ካብቶም ዝቀረቡ መማረፅታት ብምምራፅ የክብቡ ወይ ኣብቲ ክፍቲ ቦታ እቲ መልሲ ይፀሓፍ

ተራ ቁፅሪ	ሕቶ	መልሲ	ፍሉይ ምልክት	ሪማርክ
401	ዕድመ	----------ብዓመት		
402	ሃይማኖት	1. ኦርቶዶስ 2. ሙስሊም 3. ካሊእ ይገለጽ----------		
403	ኩነታት ሓዳር	1.ምስ ሰብኣያ እትነብር 2. ተፈላልያ እትነብር 3. ዝተፋተሐት 4.ዝሞታ		ተፈላልያ ማለት ሰብኣያ ንግዚዑ ኣብ ካሊእ ቦታ ዝነብር
404	ኣብ ክንደይ ዓመትኪ ተመርዒኪ?	----------ብዓመት		
405	ኩነታት ትምህርቲ ኣዶ	1. .ምንባብን ምፅሓፍን ዘይትክእል 2.ምንባብን ምፅሓፍን ጥራሕ ትክእል 3. ቀዳማይ ደረጃ ትምህርቲ ዝወድአት(1-8) 4.ካልኣይ ደረጃ ትምህርቲ ዝወድአት (9 - 12) 5. ልዕሊ ካልኣይ ደረጃ ትምህርቲ		
406	ኩነታት ትምህርቲ በዓል ቤትኪ	1. .ምንባብን ምፅሓፍን ዘይክእል 2.ምንባብን ምፅሓፍን ጥራሕ ዝክእል 3. ቀዳማይ ደረጃ ትምህርቲ ዝወድአ(1-8) 4.ካልኣይ ደረጃ ትምህርቲ ዝወድአ(9 - 12) 5. ልዕሊ ካልኣይ ደረጃ ትምህርቲ		
407	በዓል ቤትኪ ስርሑ እንታይ እዩ?	1.ሓረስታይ 2.ነጋዲ 3.ሰራሕተኛ መንግስቲ 4. ካሊእ ይገለጽ----------		
408	ላሕሚ ወይ ጠለ በጊዕ ኣለኪ/ኩም ዶ?	1.የለን 2. ሓንቲ 3. ክልተን ካብኡ ንላዕልን		ጠቅላላ ድምር ላሕሚ ወይ ጠለ በጊዕ
409	መሬት ኣለኪ/ኩም ዶ?	1.እወ 2.ክራይ 3.የለን		< ወይ= 0.5 ሄክታር
410	ሬድዮ ኣለኪ/ኩም ዶ?	1.እወ 2.የለን		
411	ርሕቀት ምንጪ ማይ ካብ ገዛ ክንደይ ደቂቃ ይወስድ?	1.ትሕቲ 15 2.15-30		ጥራሕ በፀሓካ

		3 ልዕሊ 30		ንምምላስ
412	ንጉሓፍን ርስሓትን መጠራቀሚ ዝተዳለወ ስሩዕ ቦታ ኣለኪ ዶ?	1.እወ 2.የለን		
413	ኣብ ጥቅሚ ዝወዓለ ዓይነ-ምድሪ ወይ ሽቃቅ ኣለኪ ዶ?	1.እወ 2.የለን		
414	ዓይነ-ምድሪ ምስ ተጠቀምኪ ኢድኪ ብሳሙና ትሕፀቢ ዶ?	1.የለን 2.ሓላሓሊፉ ይሕፅብ 3.ኩሉግዜ ይሕፅብ		

ክፍሊ ክልተ-ብዛዕባ ኩነታት ህማ ተሳተፍቲ

ነዞም ዝስዕቡ ሕቶታት ክከውን ዝክእል መልሲ ካብቶም ዝቀረቡ መማረፅታት ብምምራፅ የኽብቡ

ተራ ቁፅሪ	ሕቶ	መልሲ	ፍሉይ ምልክት	ሪማርክ
415	ብርሃን ፀሓይ ኣብ ዝሃለወሉ ወይ ቀትሪ ጊዜ ናይ ምርኣይ ፀገም ኣለኪ ዶ?	1.እወ 2.የለን		
416	ድሕሪ ፀሓይ ምፅዳቅ ወይ ምሸት ጊዜ ናይ ምርኣይ ፀገም ኣለኪ ዶ?	1.እወ 2.የለን		
417	ህማ ኣለኪ ዶ?	1.እወ 2.የለን		
418	ኣብ ዝሓለፈ 5 ዓመት ናይ ጥንሲ ጊዜ ህማ ሒዙኪ ነይሩ?	1.እወ 2.የለን		ንዘጥቡባ ኣዴታት ጥንሲ ነቲ ዝጠቡብ ዕሸል ኣይምልከትን
419	ኣብ ሕቶ 17ን 18ን እወ ንዝበላ ጥንሲ ዘለወን ኣዴታት ጥራሕ ዝምልከት፡ ህማ ዝሓዘኪ ወይ ዝጀመረሉ ኣብ አበየናይ ናይ ጥንሲጊዜ እዩ?	1. መጀመሪያ 3ተ ኣዋርሕ 2. ካልኣይ 3ተ ኣዋርሕ 3. ሳልሳይ 3ተ ኣዋርሕ		
420	ኣብ ሕቶ 17ን 18ን እወ ንዝበላ ዕሸል ዘጥቡባ ኣዴታት ጥራሕ ዝምልከት፡ ህማ ዝሓዘኪ ወይ ዝጀመረሉ ኣብ አበየናይ ናይ ምጥባብ ጊዜ እዩ?	1.ቀዳማይ ወርሒ 2.ካልኣይ ወርሒ 3.ሳልሳይ ወርሒ 4.ራብዓይ ወርሒ 5.ሓምሻይ ወርሒ 6.ሻድሻይ ወርሒ		
421	ዕሸል ንዘጥቡባ ኣዴታት ጥራሕ ዝምልከት፡ ኣብ ጊዜ ጥንሲ እዚ ዕሸል ህማ ሒዙኪ ነይሩ?	1.እወ 2.የለን		

ክፍሊ ሰለስተ- ብዛዕባ ጥንሲ ኣዴታትን ስርዓት ኣመጋግባን

ነዞም ዝስዕቡ ሕቶታት ክከውን ዝኽእል መልሲ ካብቶም ዝቀረቡ መማረፅታት ብምምራፅ የክብቡ

ተራ ቁፅሪ	ሕቶ	መልሲ	ፍሉይ ምልክት	ሪማርክ
422	ክንደይ በዝሒ ትሕቲ 5 ዓመት ቆልዑት ኣለዉኪ?	1.0 2.1 3.2 4. ሰለስተን ካብኡ ንላዕልን		
423	ክንደይ ቆልዑት ብህይወቶም ተወሊዶም?	1.0 2.1 3.2 4. ሰለስተን ካብኡ ንላዕልን		
424	ብጠቅላላ ክንደይ ወሊድ ኣካይድኪ?	1.0 2.1 3.2 ወይ 3 4. 4 ወይ 5 5. ሽዱሽተን ካብኡ ንላዕልን		
425	ወሊድ ምርሕሓቕኪ ኣብ ክንደይ ዓመት እዩ?	1.ትሕቲ ክልተ ወይ ክልተ 2. ሰለስተ 3. ኣርባዕተን ካብኡ ንላዕልን		
426	ጥንሲ ተነፂሉኪ ወይ ሰዲድኪ ዶ ትፈልጢ?	1.እወ 2.የለን		
427	ክንደይ ጊዜ ኣብ ውሽጢ ሓደ ሰሙን እኩል ፃባን ውፅኢት ፃባን ኣብ ስሩዕ ኣመጋግባኪ ትጥቀሚ?	1.የለን 2. ሓደ ጊዜ 3. ክልተ ጊዜ 4. ሰለስተን ካብኡ ንላዕልን ጊዜ		እተወሓደ ፍርቂ ሊትሮ
428	ክንደይ ጊዜ ኣብ ውሽጢ ሓደ ሰሙን እኩል እንቁላሊሕ ኣብ ስሩዕ ኣመጋግባኪ ትጥቀሚ?	1.የለን 2. ሓደ ጊዜ 3. ክልተ ጊዜ 4. ሰለስተን ካብኡ ንላዕልን ጊዜ		
429	ክንደይ ጊዜ ኣብ ውሽጢ ሓደ ሰሙን እኩል እንቁላሊሕን ሥጋ እንስሳን ከም እኒ ፀላም-ከብድን ኩላሊትን ዝኣመሰሉ ኣብ ስሩዕ ኣመጋግባኪ ትጥቀሚ?	1.የለን 2. ሓደ ጊዜ 3. ክልተ ጊዜ 4. ሰለስተን ካብኡ ንላዕልን ጊዜ		
430	ክንደይ ጊዜ ኣብ ውሽጢ ሓደ ሰሙን እኩል ሓምለዎት ቆፅልታት ከም እኒ ድባ-ማንጎ-ፓፓዮ -ዝኣመሰሉ ኣብ ስሩዕ ኣመጋግባኪ ትጥቀሚ?	1.የለን 2. ሓደ ጊዜ 3. ክልተ ጊዜ 4. ሰለስተን ካብኡ ንላዕልን ጊዜ		
431	ክንደይ ጊዜ ኣብ ውሽጢ ሓደ ሰሙን እኩል ብጫ ቆፅልታትን ፍራምረን ከም እኒ ኣራንሺን ካሮትን ዝኣመሰሉ ኣብ ስሩዕ ኣመጋግባኪ ትጥቀሚ?	1.የለን 2. ሓደ ጊዜ 3. ክልተ ጊዜ 4. ሰለስተን ካብኡ ንላዕልን ጊዜ		

ንምትሕብባርኪ ብጣዕሚ እየ ዘምስግን

እግዚኣብሄር የክብረለይ

Annex III: Information and consent sheet

Information Sheet and Consent Form Prepared for pregnant and lactating women who are going to participate in this Research Project, prevalence and associated factors of night blindness among pregnant & lactating women of Neader Adet woreda , Tigray regional state, North Ethiopia.

Name of Principal investigator: Kbrom Legesse

Name of the organization: University of Gondar, College of Medicine And Health Sciences, institute of Public Health

Name of the Sponsor: University of Gondar

Introduction: This information sheet and consent form is prepared to explain the study you are being asked to join. Please listen carefully and ask any questions about the study before you agree to join. You may ask questions at any time after joining the study.

Purpose of Research Project: The purpose of this research is to assess prevalence and associated factors of night blindness among pregnant & lactating women of Neader Adet woreda. The study will be helpful in determining the current magnitude of night blindness and its risk factors that contribute much to design appropriate intervention strategies. It also will serve as a springboard for subsequent studies in the country.

Procedure: To assess prevalence and associated factors of night blindness, we invite you to take part in this project. If you are willing to participate in this project, you need to understand and sign the agreement form. Then after, you will be interviewed by the data collector to give your response. You do not need to tell your name to the data collector and all your responses and the results obtained will be kept confidentially by using coding system whereby no one will have access to your response.

Risk/ Discomfort: By participating in this research project, you may feel that it has some discomfort especially on wasting time about 25 minutes. We hope you will participate in the study for the sake of the benefit of the research result. There is no risk in participating in this research project.

Benefits: If you participate in this research project, there may not be direct benefit to you but your participation is likely to help us in assessing the prevalence and associated factors of night blindness. Ultimately, this will help us to provide data for planners to implement interventions and give special attention in order to reduce the burden.

Incentives: You will not be provided any incentives or payment to take part in this project.

Confidentiality: The information collected from this research project will be kept confidential and information about you that will be collected by this study will be stored in a file, without your name, but a code number assigned to it. And it will not be revealed to anyone except the principal investigator and will be kept locked with key.

Right to refuse or withdraw: You have full right to refuse from participating in this research. You can choose not to respond to some or all questions if you do not want to give your response. You have also the full right to withdraw from this study at any time you wish, without losing any of your right.

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   Tel: +251-920-51-00-50

   Email:mekuriaw04@gmail.com

ሰነድ ብዛዕባ ሓበሬታ መፅናዕትን መጠየቂ ስምምዕነትን

መጠንን ጠንቅን ህማ አብ ጥኑሳትን ዕሸል መጥበውትን ኣዴታት ነበርቲ ናዕዴር ዓዴት ንምፅናዕ ዝተዳለወ ሰነድ ሓበሬታ ብዛዕባ እቲ መፅናዕትን መጠየቂ ስምምዕነትን

ዋና ኣፅናዒ: ክብሮም ለገሰ

ሹም ተቋም: ጎንደር ሕክምናን ጥዕና ሳይንስን ኮሌጅ ፡ሓለዋ ጥዕና ሕብረተሰብ ክፍሊ ትምህርቲ

ወጪ ዝሸፍን ተቋም: ጎንደር ዩኒቨርሲቲ

መእተዊ: እዚ ሓበሬታን መጠየቂ ስምምዕነትን ሰነድ ንስኪ ንምስታፍኪ ንጥይቀሉ መብራህርሂ ሰነድ እዩ; ንምስታፍ ቅድሚ ምውሳንኪ በቶም ሓበሬታ ሰብሰብቲ ሰነዱ ይነበብ፡ ብፅሞና ብምድምፅ ዘይተረድኣኪ ወይ ግልፂ ዘይኮነ ነገር ቅድሚ ስምምዕነት ተሳትፎ ምጅማር ምሕታት ይካኣል እዩ፡፡ ከምኡ እውን ምስታፍ ምስ ጀመርኪ ግልጺ ዘይኮነ ኣብ ማንም ሰዓት ምሕታት ትኽእሊ ኢኪ፡፡

ዕላማ መጽናዕቲ: ናይዚ መፅናዕቲ ዋና ዕላማ መጠንን ጠንቅን ህማ አብ ጥኑሳትን ዕሸል መጥበውትን ኣዴታት ነበርቲ ናዕዴር ዓዴት ንምፅናዕ እትከውን ዝተፈላለዩ መፍትሒ እቲ ፀገም ንምንፃር ዓብይ እጃም አለዎ፡፡ ብተወሳኺ ብዝበለፀ መንገዲ ንምፅናዕ ኣንፈት ንምምልካት ይሕግዝ፡፡

ከይዲ ኣሰራርሓ: መጠንን ጠንቅን ህማ አብ ጥኑሳትን ዕሸል መጥበውትን ኣዴታት ተሳተፍቲ እዚ መጽናዕቲ ንክትኮኑ ጋቢዝናክን ኣለና፡፡ ዕላማ መጽናዕቲ ብምርዳእ ንምስታፍ እተተስማዕሚዒክን፣ ምስምዕማዕክን ብፊርማክን ይገለፅ፡፡ብምቅፃል ካባኪ ሓበሬታ ንምስብሳብ ቃለ-መሕትት ብሰብሰብቲ ሓበሬታ ክካየድ እዩ፡፡ሽምኪ ምንጋር ኣየድልን፡፡መልስኹም ምስጢራዊ እዩ፡፡

ሓደጋታት ወይድማ ዘይምምችቻው: አብዙይ መጽናዕቲ ብምስታፍኪ ዘይምምችቻው ክስመዓኪ ይኽእል እዩ፡፡ ብፍላይ 25ደቂቃ ዝከውን ግዜኪ ክሻመይ ይኽእል እዩ፡፡ ነገር ግን ጽንዓቱ ካብዝሀቦ ጥቅሚ ኣንጻር ከምትሳተፉ ተስፋ ንብር፡፡ አብዙይ መጽናዕቲ ብምስታፍኩም ሓደጋ የብሉን

ጥቅሚ: አብዙይ መጽናዕቲ ብምስታፍኪ ቀጥታ ዝኾነ ጥቅሚ ዘይክትረኽቢ ትኽእሊ፡፡ ተሳትፎኪ ግን መጠንን ጠንቅን ህማ አብ ጥኑሳትን ዕሸል መጥበውትን ኣዴታት ንምፅናዕ ይጠቅም፡፡ ካብዚ ብምምስራት መዳለውቲ ትልሚ ትኩረት ንክህብሉ እዚ መፅናዕቲ ሓጋዚ እዩ፡፡

ክፍሊት: አብዙይ መጽናዕቲ ብምስታፍኪ ዝኽፈለኪ ክፍሊት የለን፡፡

ሚስጢራዊነቱ: ነዚ መጽናዕቲ ዝተሰብሰበ ሓበሬታ ብሚስጢር ዝተሓለወ እዩ፡፡ እቲ ዝስብሰብ ሓበሬታ ኣብ ፋይል እንትትሓዝ ሽምኪ ምስኡ ኣይፀሓፍን፡፡ነገር ግን መለለዪ ቁፅሪ ክግበረሉ እዩ፡፡ እቲ ሓበሬት ኣብ ናይ ዋና መፅንዒ ፋይል ጥራሕ ተቁሊፉ ስለ ዝቅመጥ ማንም ሰብ ክረኽቦ ኣይኽእልን፡፡

መሰል ምቁራፅ ኣብ ከይዲ ቃለ- መሕትት: ኣብዚ መጽናዕቲ ናይዘይምስታፍ ሙሉእ መሰል ኣለኪ፡፡ ምምላስ ዘይትደልይዮ ሕቶታት ናይ ዘይምምላስ መሰል ኣለኪ፡፡ ኣብ ዝኾነ ግዜ ናይ ምቁራፅ መሰል ኣለኪ፡፡

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Declaration

I, the undersigned, senior MPH student declare that this thesis is my original work in partial fulfillment of the requirement for the degree of Master of Public Health.

Name : _____

Signature: _____

Place of submission: Institute of Public Health, College of medicine and Health Sciences, University of Gondar.

Date of Submission: _____

This thesis work has been submitted for examination with my/our approval as university advisor(s).

Advisors

Name	Signature
_____	_____
_____	_____